Proposed Re-evaluation Decision PRVD2015-11

Octhilinone

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Overview

What Is the Proposed Re-evaluation Decision?

After a re-evaluation of the antimicrobial active ingredient octhilinone, Health Canada's Pest Management Regulatory Agency (PMRA), under the authority of the *Pest Control Products Act* and Regulations, is proposing continued registration of products containing octhilinone for sale and use in Canada.

An evaluation of available scientific information found that most uses of octhilinone products do not present unacceptable risks to human health or the environment when used according to the proposed label directions. The use of octhilinone as a material preservative in coatings (paints and stains) is proposed to be cancelled to address potential risks of concern to human health. As a requirement of the continued registration of remaining octhilinone uses, new risk-reduction measures are proposed for end-use products registered in Canada, including revised label directions.

This proposal affects the products containing octhilinone registered in Canada. Once the final re-evaluation decision is made, the registrant will be instructed on how to address any new requirements.

This Proposed Re-evaluation Decision is a consultation document[1] that summarizes the science evaluation for octhilinone and presents the reasons for the proposed re-evaluation decision. It also proposes additional risk-reduction measures to further protect human health and the environment.

The information is presented in two parts. The Overview describes the regulatory process and key points of the evaluation, while the Science Evaluation provides detailed technical information on the assessment of octhilinone.

The PMRA will accept written comments on this proposal up to 60 days from the date of publication of this document. Please forward all comments to Publications (please see contact information indicated on the cover page of this document).

What Does Health Canada Consider When Making a Re-evaluation Decision?

The PMRA's pesticide re-evaluation program considers potential risks, as well as value, of pesticide products to ensure they meet modern standards established to protect human health and the environment. Regulatory Directive DIR2012-02, *Re-evaluation Program Cyclical Re-evaluation*, presents the details of the cyclical re-evaluation approach, which is in line with the requirements of the *Pest Control Products Act*.

[1] "Consultation statement" as required by subsection 28(2) of the *Pest Control Products Act*.

For more details on the information presented in this overview, please refer to the Science Evaluation of this consultation document.

What is Octhilinone?

Octhilinone is an antimicrobial active ingredient registered in Canada for use in the preservation of coatings (paints and stains), building materials (for example caulks, sealants, and stucco), wallpaper pastes and adhesives, aqueous emulsions and adhesives, fabric, leather, polymer and vinyl compounds. The commercial end-use products containing octhilinone can be incorporated into materials or solutions to be preserved during the manufacturing process via open pour or a closed mixing/transfer system. For treatment of fabric, it can also be added during laundering operations.

Health Considerations

Can Approved Uses of Octhilinone Affect Human Health?

Octhilinone is unlikely to affect your health when used according to the proposed label directions.

Potential exposure to octhilinone may occur when handling and applying the product or through contact with materials/products containing the product as a preservative. Dietary exposure to octhilinone is not expected based on the currently registered use pattern.

Occupational exposure while handling and applying the product in an industrial setting is not of concern under the proposed conditions of use. Occupational and residential exposures through contact with materials/products (except as a material preservative in coatings (paints and stains)) containing octhilinone are not of concern under the proposed conditions of use. The use as a material preservative in coatings (paints and stains) is proposed for cancellation.

Environmental Considerations

What Happens When Octhilinone Is Introduced Into the Environment?

Octhilinone is unlikely to affect non-target organisms when used according to the proposed label directions.

Octhilinone is not expected to persist in the environment and has a low potential for bioaccumulation in biota. It is highly toxic to aquatic organisms. The use of octhilinone as a material preservative is unlikely to result in a significant environmental exposure. Standard environmental hazard and advisory label statements are proposed to be added to all product labels.

Proposed Measures to Minimize Risk

Labels of registered pesticide products include specific instructions for use. Directions include risk-reduction measures to protect human health and the environment. These directions must be followed by law. As a result of the re-evaluation of octhilinone, the PMRA is proposing further risk-reduction measures outlined below.

Human Health

- Hazard label statements on the technical grade product label
- Additional personal protective equipment to protect workers in industrial/manufacturing settings
- Cancellation of octhilinone use as a material preservative in coatings (paints and stains)
- Reduction of the maximum application rate in building materials, aqueous emulsions and adhesives, and polymer compounds
- Prohibition of use in adhesives, polymer and vinyl compounds for food contact materials
- Prohibition of use in polymer and vinyl compounds for children's toys

Environment

- Standard environmental hazard and advisory label statements.

Next Steps

During the consultation period, registrants and stakeholder organizations may submit further data that could be used to refine risk assessments, which could result in revised risk-reduction measures. Before making a final re-evaluation decision on octhilinone, the PMRA will consider any comments received from the public in response to this consultation document. A science-based approach will be applied in making a final decision on octhilinone. The PMRA will then publish a Re-evaluation Decision[2] that will include the decision, the reasons for it, a summary of comments received on the proposed decision and the PMRA's response to these comments.

[2] "Decision statement" as required by subsection 28(5) of the *Pest Control Products Act*.

Science Evaluation

1.0 Introduction

Octhilinone is an antimicrobial active ingredient used as a material preservative in a variety of materials and products. Following the re-evaluation announcement for octhilinone, the registrant of the technical grade active ingredient in Canada indicated continued support for all currently registered uses.

Currently registered products containing octhilinone are listed in Appendix I. All current uses are being supported by the registrant and were, therefore, considered in the re-evaluation of octhilinone.

The purpose of this re-evaluation is to review existing information on the active ingredient, octhilinone, and the currently registered octhilinone technical and commercial class end-use products, to ensure that risk assessments meet current standards.

2.0 The Technical Grade Active Ingredient and Its Properties and Uses

2.1 Identity

Common name		Octhilinone
Function		Plant wound protectant, fungicide, bactericide
Chemical Family		Heteroaromatic
Chemical name		
1	**International Union of Pure and Applied Chemistry (IUPAC)**	2-octyl-1,2-thiazol-3-(2*H*)-one Or 2-octylisothiazol-3(2*H*)-one
2	**Chemical Abstracts Service (CAS)**	2-octyl-3(2*H*)-isothiazolone
CAS Registry Number		26530-20-1
Molecular Formula		$C_{11}H_{19}NOS$
Structural Formula		
Molecular Weight		213.3

Based on the manufacturing process used, impurities of human health or environmental concern as identified in the Canada Gazette, Part II, Vol. 142, No. 13, SI/2008-67 (2008-06-25), including TSMP Track 1 substances, are not expected to be present in the product.

2.2 Physical and Chemical Properties

Property	Result
Vapour pressure at 25°C	4.9 mPa
Ultraviolet (UV) / visible spectrum	Maximum absorption at 276 nm at pH 2, 7, and 10 (in distilled water)
Solubility in water at 25°C	0.05%
n-Octanol/water partition coefficient at 24°C	Log K_{ow} = 2.45
Dissociation constant	Not required as the substance does not contain an acid or basic functionality

2.3 Description of Registered Octhilinone Uses

There are two technical grade, one manufacturing, and 15 commercial-class products containing octhilinone registered in Canada (Appendix I). There are no domestic-class products containing this active ingredient registered in Canada.

Octhilinone is currently registered in Canada for use as a material preservative in:

- Coatings (paints and stains) at an application rate of 0.54 to 2.16 g a.i./L.
- Building materials (for example caulks, sealants, elastomeric roof, joint cements, stucco) at an application rate of 0.54 to 1.04 g a.i./L.
- Wallpaper pastes and adhesives at an application rate of 0.36 to 0.54 g a.i./L.
- Aqueous emulsions and adhesives, for example animal glues, natural rubber latices, vegetable glues at an application rate of 0.54 to 1.04 g a.i./L.
- Fabric, new (for example tents, awnings, outdoor furniture) and laundering operations at an application rate of 0.03 to 0.05 g a.i./kg fabric treated
- Leather processing at an application rate of 0.02 to 0.04 g a.i./kg
- Polymer compounds (for example polymers used in coatings, adhesives, floor polishes, carpet backing binders, textile binders, paper coatings) at an application rate of 0.54 to 1.04 g a.i./L.
- Vinyl compounds (plastisol) (for example PVC floor, wall covering, automotive parts, coated fabrics for upholstery, mattress covers, refrigerator baskets, shower curtains) at an application rate of 1.0 to 1.2 g a.i./kg of the final formulation.

The commercial products containing octhilinone can be applied to materials and solutions to be preserved during the manufacturing process via open pour or a closed mixing/loading system.

For laundering operations, octhilinone is applied via an automated dispenser (closed mixing/transfer).

To provide further clarity, detailed use directions, including end-user, application rates and methods, are proposed to be added to the KATHON 893 Microbiocide (Registration No. 24167), MICRO-CHECK 11P Industrial Mildewcide (Registration No. 24920), MICRO-CHECK 11 Industrial Mildewcide (Registration No. 24925), and MICRO-CHECK 11 DIDP Industrial Mildewcide (Registration No. 24930) product labels.

3.0 Value

Octhilinone provides an additional material preservative active ingredient for manufacturing industries. The use of octhilinone for preservation of polymer compounds is no longer supported by one of the registrants, Rohm and Haas Canada LP, and therefore must be removed from their end-use product labels. The proposed label amendments are listed in Appendix II.

4.0 Human Health

Toxicology studies in laboratory animals describe potential health effects resulting from various levels of exposure to a chemical and identify dose levels at which no effects are observed. Unless there is evidence to the contrary, it is assumed that effects observed in animals are relevant to humans and that humans are more sensitive to effects of a chemical than the most sensitive animal species.

When assessing health risks, the PMRA considers two key factors: the levels at which no health effects occur and the levels to which people may be exposed. The dose levels used to assess risks are established to protect the most sensitive human population (for example, children and nursing mothers).

4.1 Toxicology Summary

In laboratory animals, the active ingredient octhilinone was of moderate to high acute toxicity by the oral route, of slight acute toxicity by the dermal and inhalation routes, and corrosive to the eyes and skin. Octhilinone also caused an allergic skin reaction. Consequently, the hazard signal words "DANGER – POISON, CORROSIVE TO EYES AND SKIN, and POTENTIAL SKIN SENSITIZER" are required on the label for the technical grade active ingredient. The proposed label amendments are listed in Appendix II.

Registrant-supplied short- and long-term (lifetime) animal toxicity tests, as well as information from the published scientific literature, were assessed for the potential of octhilinone to cause neurotoxicity, immunotoxicity, chronic toxicity, cancer, reproductive and developmental toxicity, and various other effects. The most sensitive endpoints used for risk assessment were decreased growth, organ weight changes (increases in adrenal gland and heart weight), and irritation of the respiratory tract.

There was no indication that the young animal was more sensitive than the adult animal. The risk assessment protects against these and any other potential effects by ensuring that the level of exposure to humans is well below the lowest dose at which these effects occurred in animal tests.

4.1.1 *Pest Control Products Act* Hazard Characterization

For assessing risks from potential residues in food or from products used in or around homes or schools, the *Pest Control Products Act* requires the application of an additional 10-fold factor to threshold effects to take into account completeness of the data with respect to the exposure of, and toxicity to, infants and children, and potential prenatal and postnatal toxicity. A different factor may be determined to be appropriate on the basis of reliable scientific data.

By extension, as the worker population could include pregnant or nursing women, it is necessary to afford the same level of protection to the fetus or nursing offspring that may be exposed via its mother. Consequently, an additional uncertainty factor like the *Pest Control Products Act* uncertainty factor may be applied to worker exposure scenarios if available data identify concerns for potential effects on the young, or if appropriate data are not available to adequately address the concerns.

With respect to the completeness of the toxicity database as it pertains to the toxicity to infants and children, extensive data were available for cuthilinone. The database contains the full complement of required studies including two developmental toxicity studies in rats, a developmental toxicity study in rabbits, and a 2-generation reproductive toxicity study in rats.

With respect to potential prenatal and postnatal toxicity, there was no indication of increased susceptibility of fetuses or offspring compared to parental animals in the reproductive and prenatal developmental toxicity studies. No developmental toxicity was noted in rats, and abortions and reduced fetal body weight observed in the rabbit occurred in the presence of significant maternal body weight loss. In the rat reproductive toxicity study, reduced body weights and body weight gains noted in offspring during the latter part of the lactation period, as well as decreased spleen and thymus weight in weanling rats, occurred in the presence of maternal toxicity (stomach irritation, decreased body weight, organ weight changes). Overall, endpoints in the young were well-characterized and not considered serious in nature. On the basis of this information, the *Pest Control Products Act* factor was reduced to 1-fold.

4.1.2 Toxicological Endpoints for Human Health Risk Assessment

Toxicological endpoints selected by the PMRA for the human health risk assessment are listed in Appendix III.

4.2 Occupational Exposure and Risk

Workers can be exposed to cuthilinone through mixing, loading and applying the pesticide in industrial or commercial settings (primary handlers) and/or when handling treated materials/products (secondary handlers).

Occupational risk is estimated by comparing potential exposures with the most relevant endpoint from toxicology studies being used to calculate a margin of exposure (MOE). This is compared to a target MOE incorporating uncertainty factors protective of the most sensitive subpopulation.

4.2.1 Primary Handler Exposure and Risk Assessment

Octhilinone liquid, granular, or solid products can be incorporated into materials or solutions to be preserved during the manufacturing process via open pour or closed mixing/transfer systems. Exposure of workers handling commercial products containing octhilinone is expected to be intermittent over a short-/intermediate- to long-term duration, predominately via the dermal route.

The risk assessment for chemical workers applying liquid and solid (pellet and granular) products containing octhilinone was conducted using exposure data from the Chemical Manufacturers Association (CMA) Antimicrobial Exposure Study.

The risks for workers handling octhilinone products were assessed using a conservative scenario (open pour of liquid and solid formulations) and assuming different levels of personal protective equipment (PPE). The CMA study does not include an exposure scenario that corresponds to the application of granular or pellet formulation of octhilinone. Therefore, for this scenario it was necessary to extrapolate from the most representative scenario (solid pour of powder formulations). While the powder pour scenario is not expected to underestimate the exposure for workers handling octhilinone products, the resulting risk estimates, particularly the inhalation estimate, are considered to be conservative due to the formation of dust particles during the open pour application of powder formulation.

For workers applying liquid products via open pour, both short-/intermediate- and long-term target dermal and inhalation MOE's were achieved assuming PPE consisting of a long-sleeved shirt, long pants, chemical-resistant gloves, and a respirator.

For workers applying solid products via open pour, short-/intermediate- dermal and long-term dermal target MOE's were achieved assuming PPE consisting of chemical-resistant coveralls over a long-sleeved shirt and pants and chemical-resistant gloves. Assuming the use of a respirator, the short-/intermediate- but not long-term target inhalation MOE was achieved. However, given the conservatism in the risk assessment (for example, exposure data for the powder formulation and the 90th percentile of exposure dose from the CMA study), the long-term inhalation risk is likely to be overestimated. On this basis, the potential long-term inhalation risk is expected to be sufficiently mitigated with the use of a respirator.

Based on the results of the risk assessment, the following PPE is proposed for workers in manufacturing facilities:

- liquid products – a long-sleeved shirt, long pants, chemical-resistant gloves, plus a respirator unless a closed mixing/loading system is used.

- solid (pellet, granular) products – chemical-resistant coverall over a long-sleeved shirt and long pants, chemical-resistant gloves, plus a respirator unless a closed mixing/loading system is used

A requirement of protective eyewear is already included on cellulose liquid and granular end-use product labels. Protective eyewear is not required for currently registered cellulose products formulated as pellets.

For laundering operations, end-use products containing cellulose are applied through automated dispensers; therefore, the potential for exposure is low. PPE consisting of a long-sleeved shirt, long pants and chemical-resistant gloves is proposed for workers handling cellulose in laundering operations.

The proposed label amendments are listed in Appendix II.

6.2.2 Secondary (Handler) Exposure and Risk

There is potential for exposure of workers in occupational settings resulting from handling/applying treated products. Exposure of secondary handlers is expected to be of short- to long-term duration.

The risk assessment for workers handling/applying treated products was conducted using exposure data from the Pesticide Handlers Exposure Database (PHED). There are limitations with PHED as it does not contain exposure scenarios that correspond with all of the cellulose uses (for example, sealants, grouts, carpets, vinyl floors, building materials). As a result, it was necessary for these scenarios to extrapolate from the most representative PHED scenario, which is paint application. It was assumed that exposure resulting from paintbrush applications would be equal to or greater than exposure from applying other materials/products. The PHED paintbrush scenario may be conservative in extrapolating to other uses; therefore, the assessment is not expected to underestimate exposure.

Daily exposure estimates for professional painters were calculated using PHED and exposure values for workers wearing a single layer of clothing and no gloves while applying paint. Additional assumptions included the currently approved application rates (0.5% 2.0% g a.i./L) and a volume of paint of 19 L (paintbrush) and 190 L (airless sprayer).

For professional painters using a paintbrush, short- to long-term target MOEs are achieved only at the current minimal application rate of 0.5% g a.i./L. Potential risks of concern have been identified at higher application rates. However, for professional painters using an airless sprayer, long-term risks are of potential concern at all assessed application rates.

Therefore, to protect secondary handlers, the PMRA proposes to

- Cancel the use of octhilinone as a material preservative in coatings (paints and stains);
- Reduce the maximum application rate in building materials, polymer compounds, aqueous emulsions and adhesives to 0.54 g a.i./L.

The maximum application rate of octhilinone for use in the preservation of vinyl compounds is higher than the minimal application rate in coatings. However, considering that octhilinone will be embedded in vinyl products, thus, not readily available for transfer, exposure of workers handling/installing these products is not expected to be of concern under current conditions of use. On this basis, no rate reduction is proposed for the use of octhilinone in vinyl compounds. For octhilinone use in fabric and leather, currently approved application rates are lower than the minimal application rate in coatings.

The proposed label amendments are listed in Appendix II.

4.3 Non-occupational Exposure

4.3.1 Residential Exposure and Risk

The registered end-use products containing octhilinone are not available for use by homeowners. However, finished products treated with octhilinone are used by consumers and have the potential for post-application residential exposure. Octhilinone-treated products that may routinely be used in the residential setting include paints, grouts, sealants, carpets, vinyl floors, and fabric and leather products.

For homeowners applying/installing treated products (for example paints and grouts), exposure is expected to be of a short-term duration. Dermal and inhalation exposure estimates for homeowners were calculated using PHED exposure data for individuals wearing a short-sleeved shirt, short pants, and no gloves while painting with a paintbrush or an airless sprayer. In the absence of use information for products other than paint, it was assumed that exposure resulting from applications of paint using a paintbrush would be equal to or greater than exposure from handling other products. Additional assumptions included the currently registered application rates for preservation of coatings and a volume of paint of 7.6 L (paintbrush) and 19 L (airless sprayer). For homeowners applying treated paint using a paintbrush or an airless sprayer, risks are not of concern using the lowest application rate of 0.54 g a.i./L. Potential risks of concern have been identified at higher application rates. The use in paint is proposed for cancellation based on potential concerns for professional painters. No further measures are proposed to mitigate exposure of homeowners handling/applying octhilinone-treated products.

For individuals in residential settings coming in contact with treated consumer products such as clothing, mattresses, carpets or vinyl floors, post-application exposures in residential settings are expected to be of short-/intermediate-term durations. Exposure estimates for individuals in residential settings were based on the United States Environmental Protection Agency (USEPA) assessments conducted for the 2007 Registration Eligibility Decision (RED) for octhilinone. The following high-end exposure scenarios assessed by the USEPA were considered relevant to the Canadian situation:

- Dermal and non-dietary oral (hand-to-mouth) exposures of children to octhilinone in treated carpets
- Dermal and non-dietary oral (hand-to-mouth) exposures of children to octhilinone in treated vinyl floors
- Dermal and non-dietary oral (mouthing) exposure of children to octhilinone in treated clothing
- Dermal exposure of adults and children to octhilinone in mattresses

The USEPA exposure estimates were adjusted to reflect currently approved Canadian maximum application rates. Using the toxicological endpoi s selected by the PMRA, short-/intermediate-term target MOEs were achieved for all assessed scenarios. No further measures are proposed to mitigate exposure of the general population to octhilinone.

4.3.2 Residue Limits in Food Commodities

In Canada, octhilinone is not registered for food or feed use. There are no Canadian Maximum Residue Limits established for imported commodities for octhilinone.

4.3.3 Dietary Exposure and Risk

Exposure from food is not anticipated based on the currently registered use pattern. The PMRA proposes that octhilinone product labels include a specific prohibition against the use of octhilinone-treated materials, such as adhesives and polymer compounds, for food packaging. The proposed label amendments are listed in Appendix II.

The absence of monitoring data in both Canada and the United States did not allow for an estimation of the residues of octhilinone in potential drinking water sources to be calculated through statistical analysis of monitoring data. However, exposure from drinking water is not anticipated considering that direct applications of octhilinone to food/feed crops are not expected and industrial uses are unlikely to result in a significant environmental exposure.

4.3.4 Aggregate Exposure and Risk

Aggregate risk combines the different routes of exposure to octhilinone in residential settings. Short- and intermediate-term aggregate risk assessments are comprised of contributions from food, drinking water and non-occupational exposure (dermal, inhalation).

Based on the revised use pattern for octhilinone, there is potential for aggregate dermal exposure of adults and children to products treated with this active ingredient, for example dermal exposure of children to octhilinone-treated clothing, vinyl floor, carpet, and mattress. Given that dietary exposure to octhilinone is not anticipated, only residential exposure scenarios were considered in the aggregate risk assessment. Based on the risk assessment, the PMRA determined that the aggregate dermal risk for adults and children is not of concern.

The current aggregate risk assessment does not account for exposure of children to octhilinone in plastic toys. Based on the available information, octhilinone-treated polymer compounds are not used in the manufacture of children's toys in Canada or the United States. To prevent the future use of octhilinone in toys, the PMRA proposes that that octhilinone product labels include a specific prohibition against the use of octhilinone-treated materials in the manufacture of children's toys. Proposed label amendments are listed in Appendix II.

4.3.5 Cumulative Assessment

The *Pest Control Products Act* requires that the PMRA consider the cumulative exposure to pesticides with common mechanisms of toxicity. For the current re-evaluation, the PMRA did not identify information indicating that octhilinone shares a common mechanism of toxicity with other pest control products; therefore, there is no requirement for a cumulative assessment at this time.

5.0 Environment

Octhilinone is not expected to persist in soil (DT_{50} values of 0.4- 4 days) or water (half-life ($T_{1/2}$) of 0.6-2.1 days). The active ingredient is not volatile and it is not expected to be subject to long range transport. Octhilinone is not expected to bioaccumulate in biota (log K_{ow} of 2.45; bioconcentration factor (BCF) of 405-629 for the whole fish).

Octhilinone was found to be moderately toxic to terrestrial organisms and highly toxic to aquatic organisms. Standard environmental hazard label statements are proposed to be added to product labels.

Material preservative uses of octhilinone for building materials, wallpaper paste and adhesives, aqueous emulsions, fabric, leather, polymer and vinyl compounds are expected to have low potential for environmental exposure. On this basis, the environmental risk is not expected to be of concern.

Standard environmental label statement relating to effluent discharge and disposal of containers and unwanted products are proposed to be added to product labels as per current label standard. The proposed label amendments are listed in Appendix II.

6.0 Pest Control Product Policy Considerations

6.1 Toxic Substances Management Policy Considerations

The Toxic Substances Management Policy (TSMP) is a federal government policy developed to provide direction on the management of substances of concern that are released into the environment. The TSMP calls for the virtual elimination of Track 1 substances [those that meet all four criteria outlined in the policy: in other words, persistent (in air, soil, water and/or sediment), bioaccumulative, primarily a result of human activity and toxic as defined by the *Canadian Environmental Protection Act*].

During the re-evaluation process, octhilinone was assessed in accordance with the PMRA Regulatory Directive DIR99-03, *The Pest Management Regulatory Agency's Strategy for Implementing the Toxic Substances Management Policy,* and evaluated against the Track 1 criteria. In order for octhilinone to meet Track 1 criteria, the criteria for both bioaccumulation and persistence (in one media) must be met. The PMRA has reached the following conclusion:

- Octhilinone half-life in soil and water (DT_{50} values of 0.4- 4 days and a half-life ($T_{1/2}$) of 0.6-2.1 days, respectively) is below the TSMP Track 1 criteria (half-life in water or soil $\geq$ 182 days or in sediment > 365 days), therefore it is concluded that octhilinone does not meet the criteria for persistence.
- The log K_{ow} = 2.45 and the BCF of 405-629 for octhilinone are below the TSMP Track 1 criteria (log $K_{ow} \geq 5$; BCF$\geq$5000). On this basis, it is concluded that octhilinone does not meet the criteria for bioaccumulation.
- Octhilinone does not meet all Track 1 criteria and therefore is not considered a Track 1 substance.

6.2 Formulants and Contaminants of Health or Environmental Concern

During the re-evaluation of octhilinone, contaminants in the technical are compared against the *List of Pest Control Product Formulants and Contaminants of Health or Environmental Concern* maintained in the *Canada Gazette.*[3] The list is used as described in the PMRA Notice of Intent NOI2005-01 and is based on existing policies and regulations including DIR99-03 and DIR2006-02, and taking into consideration the Ozone-depleting Substance Regulations, 1998, of the *Canadian Environmental Protection Act* (substances designated under the Montreal Protocol). The PMRA has reached the following conclusion:

- Technical grade octhilinone does not contain any contaminants of health or environmental concern identified in the *Canada Gazette.*

The use of formulants in registered pest control products is assessed on an ongoing basis through PMRA formulant initiatives and Regulatory Directive DIR2006-02.

7.0 Incident Reports

Since 26 April 2007, registrants have been required by law to report incidents, including adverse effects to health and the environment, to the PMRA within a set time frame.

As of May 2015, there were no incidents reported for octhilinone.

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[3] *Canada Gazette*, Part II, Volume 139, Number 24, pages 2641–2643: *List of Pest Control Product Formulants and Contaminants of Health or Environmental Concern* and in the order amending this list in the *Canada Gazette*, Part II, Volume 142, Number 13, pages 1611-1613. *Part 1 Formulants of Health or Environmental Concern, Part 2 Formulants of Health or Environmental Concern that are Allergens Known to Cause Anaphylactic-Type Reactions and Part 3 Contaminants of Health or Environmental Concern.*

8.0 Organisation for Economic Co-operation and Development Status

Canada is part of the Organisation for Economic Co-operation and Development (OECD), which provides a forum in which governments can work together to share experiences and seek solutions to common problems.

As part of the re-evaluation of an active ingredient, the PMRA takes into consideration recent developments and new information on the status of an active ingredient in other jurisdictions, including OECD member countries. In particular, decisions by an OECD member country to prohibit all uses of an active ingredient for health or environmental reasons are considered for relevance to the Canadian situation.

Octhilinone is currently acceptable for use in other OECD member countries, including the United States and Europe. As of 1 March 2015, no decision by an OECD member country to prohibit all uses of octhilinone for health or environmental reasons has been identified.

9.0 Proposed Re-evaluation Decision

The PMRA is proposing that products containing octhilinone are acceptable for continued registration with the implementation of the proposed risk-reduction measures. The use as a material preservative in coatings (paints and stains) is proposed for cancellation. Revised label directions are proposed for remaining uses. These measures are proposed to protect human health.

The proposed mitigation measures are presented in Appendix II. No additional data are being requested at this time.

10.0 Supporting Documentation

PMRA documents, such as Regulatory Directive DIR2012-02, *Re-evaluation Program Cyclical Re-evaluation*, can be found on the Pesticides and Pest Management portion of Health Canada's website at www.healthcanada.gc.ca/pmra. PMRA documents are also available through the Pest Management Information Service. Phone: 1-800-267-6315 within Canada or 1-613-736-3799 outside Canada (long distance charges apply); fax: 613-736-3798; e-mail: pmra.infoserv@hc-sc.gc.ca.

The federal TSMP is available through Environment Canada's website.

List of Abbreviations

a.i.	active ingredient
BCF	bioconcentration factor
bw	body weight
CAS	Chemical Abstracts Service
cm^2	centimetre(s) squared
CMA	Chemical Manufacturers Association
DACO	data code
DT_{50}	dissipation time to 50%
EC_3	estimated concentration required to produce a stimulation index of three
EEC	estimated environmental concentration
g	gram(s)
IUPAC	International Union of Pure and Applied Chemistry
kg	kilogram(s)
K_{ow}	*n*-octanol–water partition coefficient
L	litre(s)
LLNA	local lymph node assay
LOC	level of concern
mg	milligram(s)
MOE	margin of exposure
mPa	millipascal
nm	nanometre(s)
NOAEC	no observed adverse effect concentration
NOAEL	no observed adverse effect level
OECD	Organisation for Economic Co-operation and Development
pH	log10 hydrogen ion concentration
PHED	Pesticide Handler Exposure Database
PMRA	Pest Management Regulatory Agency
PRVD	Proposed Re-evaluation Decision
PVC	polyvinyl chloride
RED	Registration Eligibility Decision
RQ	risk quotient
RVD	Re-evaluation Decision
$T_{1/2}$	half life
TSMP	Toxic Substances Management Policy
USEPA	United States Environmental Protection Agency
UV	ultraviolet

Appendix I Registered Products Containing Octhilinone as of 26 May 2015

Registration Number	Marketing Class	Registrant	Product Name	Formulation Type	Guarantee (w/w)
24126	T	Rohm and Haas Canada LP	KATHON TM 893TT TECHNICAL MICROBICIDE	Liquid	99.4%
27038	T	Thor GmbH	ACTICIDE OIT TECHNICAL INDUSTRIAL MICROBICIDE	Solution	98%
31812	T	Troy Chemical Corporation	MERGAL OIT TECHNICAL MICROBICIDE	Solution	99.4%
31254	MC	Thor GmbH	ACTICIDE 45-F		45%
23955	C	Rohm and Haas Canada LP	SKANE (TM) M-8 MICROBICIDE	Solution	45%
24167	C	Rohm and Haas Canada LP	KATHON TM 893 MICROBICIDE	Solution	45%
24850	C	Rohm and Haas Canada LP	BIOBAN™ O 5P5 ANTIMICROBIAL	Solution	5%
24920	C	Ferro Chemicals Group	MICRO-CHEK 11P INDUSTRIAL MILDEWCIDE	Granular	4%
24925	C	Ferro Chemicals Group	MICRO-CHEK 11 INDUSTRIAL MILDEWCIDE	Solution	4%
24930	C	Ferro Chemicals Group	MICRO- CHEK 11 DIDP INDUSTRIAL MILDEWCIDE	Solution	4%
25161	C	Morton International Inc.	VINYZENE TM SB-8 BIOCIDE	Pellet	10%
25174	C	Morton International Inc.	VINYZENE IT 3010 DIDP BIOCIDE	Solution	10%
25628	C	Rohm and Haas Canada LP	KATHON TM 4200 MICROBICIDE	Solution	25%
25630	C	Rohm and Haas Canada LP	KATHON TM TP 25% MICROBICIDE	Solution	25%
26177	C	Thomson Research Associates	ULTRA-FRESH DM-25	Solution	25%
27271	C	Thor GmbH	THOR ACTICIDE 45 MILDEWCIDE	Solution	45%
27397	C	Ecolab Co.	TEX-STAT II	Solution	5%
31196	C	Akcros Chemicals Inc.	INTERCIDE(R) OBF-10 DIDP	Solution	10%
31197	C	Akcros Chemicals Inc.	INTERCIDE(R) OBF-10 SVC	Pellet	10%

Appendix II Label Amendments for Products Containing Octhilinone

The label amendments presented below do not include all label requirements for individual products, such as first aid statements, disposal statements, precautionary statements, and supplementary protective equipment. Additional information on labels of currently registered products should not be removed unless it contradicts the following label statements.

TECHNICAL GRADE PRODUCT LABEL

I) The following statements are proposed to be included on the primary panel of the technical grade products:

CORROSIVE TO THE EYES AND SKIN
POTENTIAL SKIN SENSITIZER

II) The following statements are proposed to be included in a section entitled **PRECAUTIONS** on the technical grade product label:

DANGER – POISON
CORROSIVE TO THE EYES AND SKIN
POTENTIAL SKIN SENSITIZER
DO NOT discharge effluent containing this product into sewer systems, lakes, streams, ponds, estuaries, oceans or other waters.

III) The following statements are proposed to be included in a section entitled **ENVIRONMENTAL HAZARD** on the technical grade product label:

TOXIC to aquatic organisms.

IV) The following statements are proposed to be included in a section entitled **DISPOSAL** on the technical grade product label:

Canadian manufacturers should dispose of unwanted active ingredients and containers in accordance with municipal or provincial regulations. For additional details and clean-up of spills, contact the manufacturer or the provincial regulatory agency.

COMMERCIAL END-USE PRODUCT LABELS

I) The following uses of octhilinone are proposed to be removed from the end-use product labels (Registration Nos. 24167 and 25630) as it is no longer supported by the registrants:

i. Polymer compounds

II) The following use of octhilinone is proposed to be removed from the end-use products labels (Registration Nos. 23955, 24167, 25630, 27271) due to concerns for human health:

i. Coatings

III) The maximum application rate for the following uses is proposed to be reduced to 0.54 g a.i./L:

Registration No.	Use	Concentration	Proposed product application rate
23955	Building materials Aqueous adhesives and sealant preservation	45%	1.2 kg/1000L
24167	Caulks and sealants Aqueous emulsion and adhesives	45%	1.2 kg/1000L
25630	Caulks and sealants Aqueous emulsions and adhesives	25%	2.16 kg/1000L
27271	Caulks and sealants Aqueous emulsions and adhesives Polymer compounds	45%	1.2 kg/1000L

IV) Detailed use directions, including end-uses, application rates and methods (for example, open pour or a closed mixing/loading system), are proposed to be added to the KATHON 893 Microbiocide (Registration No. 24167), MICRO-CHECK 11P Industrial Mildewcide (Registration No. 24920), MICRO-CHECK 11 Industrial Mildewcide (Registration No. 24925), and MICRO-CHECK 11 DIDP Industrial Mildewcide (Registration No. 24930) product labels.

V) The following statements are proposed to be included on the primary panel of the end-use product labels for use in:

- adhesives (Registration Nos. 23955, 24167, 25630, 27271)
- polymer compounds (Registration No.27271)
- vinyl compounds (Registration Nos. 24920, 24925, 24930, 25161, 25174, 31196, 31197)

For use as a material preservative in non-food contact materials and products

VI) The following statements are proposed to be included in the **DIRECTIONS FOR USE** section of the end-use product labels registered for use in polymer and vinyl compounds:

DO NOT use for polymer compounds for toys (Registration No. 27271)

OR

DO NOT use for vinyl compounds for toys (Registration Nos. 24920, 24925, 24930, 25161, 25174, 31196, 31197)

VII) The following statements are proposed to be included in the [illegible] section of all end-use product labels:

DO NOT contaminate irrigation or drinking water supplies or aquatic habitats by cleaning of equipment or disposal of wastes.

DO NOT discharge effluents containing this product into sewer systems, lakes, streams, ponds, estuaries, oceans, and other waters unless the effluent has been detoxified to suitable means.

VIII) The following statement is proposed to be included in the [illegible] section of the end-use product labels:

End-use products formulated as solutions (Registration Nos. 23955, 24167, 24850, 25178, 24925, 24930, 25626, 25630, 26177, 27271, 27397, 31196):

Wear a long-sleeved shirt, long pants, chemical-resistant gloves, goggles or face shield, and a NIOSH-approved organic vapour-removing cartridge with a prefilter approved for pesticides OR a NIOSH-approved canister approved for pesticides during mixing, loading, application, clean up, maintenance, and repair. A respirator is not required for mixers/loaders/applicators using a closed mixing/loading system.

End-use products formulated as granules or pellets (Registration Nos. 24920, 27161, and 31197):

Wear chemical-resistant coveralls over a long-sleeved shirt, long pants, chemical-resistant gloves, and a NIOSH-approved organic vapour-removing cartridge with a prefilter approved for pesticides OR a NIOSH-approved canister approved for pesticides during mixing, loading, application, clean up, maintenance, and repair. A respirator is not required for mixers/loaders/applicators using a closed mixing/loading system.

IX) In the [illegible] section of all end-use product labels, the existing statement "This product is toxic to fish and wildlife" is proposed to be replaced with the following statement:

TOXIC to aquatic organisms. It is not to be used in circumstances that would cause or allow it to enter lakes, streams, ponds, estuaries, oceans or other waters in contravention of federal or provincial regulatory requirements. The requirements of applicable laws should be determined before using the product.

X) In the [illegible] section (Reg. Nos. 24920, 24925, 24930) the existing statements are proposed to be replaced with the following statements:

1. Triple- or pressure-rinse the empty container. Add the rinsings to the treatment site.

2. Follow provincial instruction for any required additional cleaning of the container prior to its disposal.

5. Make the empty container unsuitable for further use.

6. Dispose of the container in accordance with provincial requirements.

7. For information on disposal of unused, unwanted product, contact the manufacturer or the provincial regulatory agency. Contact the manufacturer and the provincial regulatory agency in case of a spill, and for clean-up of spills.

Appendix III Toxicological Endpoints for Human Health Risk Assessment

Exposure Scenario	Study	Point of Departure and Endpoint	Target MOE
Short- to intermediate-term dermal	90-day dermal toxicity study in rats	NOAEL for systemic toxicity = 25 mg/kg bw/day, based on decreased body weight and body weight gain in males and increased adrenal gland and heart weight in females	100
Long-term dermal	90-day dermal toxicity study in rats	NOAEL for systemic toxicity = 25 mg/kg bw/day, based on decreased body weight and body weight gain in males and increased adrenal gland and heart weight in females	300[a]
Short- to intermediate-term inhalation	90-day inhalation toxicity study in rats	NOAEC = 0.64 mg/m^3 (0.17 mg/kg bw/day), based on decreased body weight and body weight gain, clinical signs, and nasal cavity lesions	100
Long-term inhalation	90-day inhalation toxicity study in rats	NOAEC = 0.64 mg/m^3 (0.17 mg/kg bw/day), based on decreased body weight and body weight gain, clinical signs, and nasal cavity lesions	300[a]
Non-dietary oral ingestion (short- to intermediate-term)	Developmental toxicity study in rats	NOAEL for maternal toxicity = 5 mg/kg bw/day, based on decreased body weight and body weight gain, salivation and one death	100
Dermal sensitization	LLNA study in mice	EC_3 = 0.46% (230 µg/cm^2)	100
Cancer	A cancer risk assessment was not required		

[a] Includes a 3-fold factor to extrapolate from a short-term to a long-term exposure scenario.
NOAEL – no observed adverse effect level; NOAEC – no observed adverse effect concentration; EC_3 - estimated concentration required to produce a stimulation index of three; MOE – Margin of Exposure

References

A. Studies Considered in the Chemistry Assessment

List of Studies/Information Submitted by Applicant/Registrant (Unpublished)

Registration No. 24126

PMRA Document Number	Reference
1845771	RH893 Tech Chromatograms for Canadian Registration Package, Long-term Stability, Kathon 893T Industrial Microbicide Formal Report of Analysis for Compounds, DACO: 2.99
1845772	Kathon 893T: Impurity Analysis for EPA Registration, DACO: 2.13 CBI
1845790	Density, Vapour Pressure, Dissociation Constant, Octinol/Water Partitioning Coefficient, Stability, Spectrum, DACO: 2.14.10,2.14.11,2.14.12,2.14.13,2.14.14,2.14.6,2.14.9
1845907	Kathon 893T Active Ingredient Specifications, DACO: 2.1,2.11,2.12,2.13,2.14,2.2,2.3,2.5,2.7,2.8,2.9
1845908	Kathon 893T Microbicide Product Chemistry, DACO: 2.1,2.11,2.12,2.13,2.14,2.2,2.3,2.4,2.5,2.6,2.7,2.8,2.9
1845911	Kathon LM Plus Product Chemistry Appendix 1 to 6, DACO: 0.9,2.1,2.11,2.16,2.2,2.3,2.4,2.5,2.6,2.7,2.8,2.9
1845915	Kathon LM Plus Product Chemistry Appendix 1 to 4, DACO: 0.9.1,2.11,2.12,2.13,2.16
1847019	2008, Product Chemistry Series 830 Group A: Product Identity, Composition, and Analysis of OIT Biocide from, DACO: 2.11.1,2.11.2,2.11.3,2.11.4,2.12.1,2.13.1,2.13.2,2.13.3
1915616	2000, GLP-2000-008-[privacy removed] 5 Batch Data, DACO: 10.6
1952432	2010, GLP-2010-012 [privacy removed] 5 lot analysis, DACO: 2.13.2,2.13.3

Registration No. 27038

PMRA Document Number	Reference
1473774	1998, Part 2 Chemistry. Annex, DACO: 2.13
1476180	1999, Part 2.12.1 Establishing Certified Limits, DACO: 2.12.1
1476214	1995, Part 2 Chemistry (TGAI), DACO: 2.1,2.10,2.11,2.2,2.3,2.4,2.5,2.6,2.7,2.8,2.9
1476264	1995, Product Identity and Composition of Acticide 45, DACO: 2.12.1
1476350	1994, Product Identity and composition of Acticide 45., DACO: 2.12.2
1476508	1994, 61-2 Description of Begining Materials and Manufacturing Process., DACO: 2.11
1476517	1994, Process Diagram of Quality and Production Control for Acticide 45, DACO: 2.11.3
1476524	1994, Acticide 45 Attachment A Sales Specifications and Material Safety Data Sheets for [CBI removed], DACO: 0.9,2.16
1476542	1994, Acticide 45, Attachment B Sales Specifications Material Safety Data Sheets for, DACO: 0.9,2.16
1476543	1994, Acticide 45, Attachment C, Sales Specifications and Material Safety Data Sheets for, DACO: 0.9,2.16
1476638	1994, Acticide 45, Attachment D, Sales Specifications and Material Safety Data Sheets for., DACO: 0.9,2.16
1476646	1994, Acticide 45, Attachment E, Sales Specifications and Material Safety Data Sheets for, DACO: 0.9,2.16
1476832	1994, Acticide 45 Attachment F Evolution of the Manufacturing Process at, DACO: 2.11.3
1476844	1994, Acticide 45 62-2 Certification of Ingredient Limits., DACO: 2.13.1
1476911	1994, Process Diagram of Quality and production control for Acticide 45, DACO: 2.14.1
1476915	1994, Analysis and Certification of Product Ingredients of Acticide 45., DACO: 2.16
1476930	1994, Analytical Methods to Verify Certified Limits, DACO: 2.12.1
1476983	1994, Appendix I, Validation of Analytical Methods, DACO: 2.16,7.2.3
1477088	1994, Determination of in the Technical Grade Active Ingredient and in Acticide 45., DACO: 2.15
1477116	1994, Acticide 45, General Summary of Report on Impurities: Identification and Quantitative Analysis of Impurities., DACO: 2.15

1477133	1994, Summary of Physical and Chemical Characteristics of Acticide 45, DACO: 2.14
1477142	1994, 1 Year Storage Stability of Acticide 45., DACO: 2.14.14
1473774	Part 2 Chemistry. Annex Headspace/GC/FID analysis and GC/FID analysis, DACO: 2.13.3

B. Studies Considered in the Human Health Risk Assessment

List of Studies/Information Submitted by Applicant/Registrant (Unpublished)

PMRA Document Number	Reference
1141899	Skane M-8 HQ Micobicide - Thirteen-week inhalation toxicity study in rats (87R-013; 86P-196). June 29, 1989. DACO: 4.7
1141900	A teratology study in rats with Skane M-8 HQ. Final Report (WIL-91003; 87RC-009; 86P-340). March 31, 1987. DACO: 4.5.2
1141901	Skane M-8 HQ Industrial Mildewcide: Oral (gavage) developmental toxicity study in rabbits (87R-019; 86P-504). January 12, 1987. DACO: 4.5.2
1141903	Skane M-8 HQ Microbicide CHO/HGPRT gene mutation assay (86R-055; 85P-532). August 11, 1986. DACO: 4.5.4
1141904	Skane M-8 Microbicide: In An In Vitro Cytogenetic Assay Measuring Chromosomal Aberration Frequencies In Chinese Hamster Ovary (CHO) Cells Amended Final Report (86RC-0048; 85P-551; 20990; 8756). March 27, 1987. DACO: 4.5.4
1141906	Skane M-8 HQ In Vivo Cytogenetic Study In Rats (86R-218; 86P-360). DACO: 4.5.4
1141907	Skane M-8 HQ Microbiocide In Vitro Unscheduled DNA Synthesis Assay (86R-0018; 85P-560). DACO: 4.5.4
1141908	Skane M-8 HQ: Salmonella typhimurium gene mutation assay (88R-203; 88P-214). DACO: 4.5.4
1157811	Evaluation of the upper airway irritation potential (RD50) (285-046;90RC-180)(KATHON 893T), DACO: 4.2.3
1213891	Skane M-8 - Acute inhalation toxicity study in rats (85R-203), DACO: 4.2.3
1213893	A study of the concentration-dependent delay contact hypersensitivity in guinea pigs (83R-143), DACO: 4.2.6
1232110	Dermal Hazards of Cloth Treated with RH-893 to Human Skin, DACO: 4.6.6

1232111	Dermal Hazards of Cloth Treated with RH-893 to Human Skin, DACO: 4.6.6
1232250	Acute oral-Rats; Acute dermal-Rabbits; Acute eye irritation-Rabbit; Acute Inhalation-Rats, DACO: 4.2.1,4.2.2,4.2.3,4.2.4
1232251	Acute Oral LD50 - Rats - RH893 TECH, DACO: 4.2.1
1232252	Oral Dose Range - Rabbit, DACO: 4.2.1
1232253	Oral Dose Range and Acceptability Study - Dogs - RH-893 TECH, DACO: 4.2.1
1232256	Sensitizing Properties - Human Volunteers - RH893 TECH, DACO: 4.2.6
1240141	KATHON 893 - Acute Dermal Toxicity, DACO: 4.2.2
1240145	Skin Sensitization Study - Guinea Pigs: RH893 TECH (Final Report), DACO: 4.2.6
1261637	2003, Acticide OIT Local Lymph Node Assay (LLNA) in Mice, DACO: 4.2.6
1261638	2002, Acute Oral Toxicity Study of Acticide OIT 100% in Rats, DACO: 4.2.1
1261639	2002, IN VITRO Mammalian Chromosome Aberration Test of Acticide OIT 100% with Human Lymphocytes, DACO: 4.5.6
1261640	2003, IN VIVO Unscheduled DNA Synthesis in Rat Hepatocytes with Acticide OIT, DACO: 4.5.8
1261641	1995, N-octylisothiazolone (OIT) 94% 90-Day Dermal Subchronic Toxicity Study in the Rat, DACO: 4.3.4
1261642	1995, N-octylisothiazolone (OIT) 94% Induction of Micronuclei in the Bone Marrow of Treated Mice, DACO: 4.5.7
1261643	1995, N-octylisothiazolone (OIT) 94% Mutation at the Thymidine Kinase (TK) Locus of Mouse Lymphoma L5178Y Cells Using Microtitre Fluctuation Technique, DACO: 4.5.5
1261644	1995, N-octylisothiazolone (OIT) 94% Oral (Gavage) Teratogenicity Study in the Rat, DACO: 4.5.2,4.5.8
1261645	1995, N-octylisothiazolone (OIT) 94% Reverse Mutation in 5 Histidine-requiring Strains of Salmonella Typhimurium, DACO: 4.5.4
1261646	1995, N-octylisothiazolone (OIT) 96% 14-Day Dermal Subacute Toxicity Study in the Rat, DACO: 4.3.8
1261647	1995, N-octylisothiazolone (OIT) 96% 14-Day Oral (Gavage) Range-Finding Study in the Female Rat, DACO: 4.3.8,4.5.2
1334749	2006, Acticide OIT DACO 4.2 Acute Studies, DACO: 4.2.1,4.2.2,4.2.3,4.2.4,4.2.5,4.2.6
1401574	2007, 90-day dietary toxicity study with Acticide OIT (2-n-octyl-4-isothiazolin-3-one) in the rat, DACO: 4.3.1

1401577	2007, 90-day dietary toxicity study with Acticide OIT (2-n-octyl-4-isothiazolin-3-one) in male and female beagle dogs, DACO: 4.3.2
1631270	1994, Kathon biocide: 24-month drinking water chronic/oncogenic study in rats., DACO: 4.4.4
1792779	1983, Kathon 886 MMPA process_13-wk Inhalation Toxicity Study in Rats, DACO: 4.3.6
2150226	2006, Two-Generation Reproduction Toxicity Study with Acticide OIT by Dietary Administration in Wistar Rats, DACO: 4.5.1
2249335	2012, Relevance of inhalative exposure for OIT containing wood preservatives and read across from a 90 day inhalation study conducted on CIT/MIT, a related compound:, DACO: 4.3.6
2249338	2012, 2-n-Octyl-4-isothiazolin-3-one Justification for the non-submission of data: Chronic toxicity/Oncogenicity, DACO: 4.4.1,4.4.2,4.4.3
2249344	2007, Absorption, Distribution, Metabolism and Excretion of OIT in Wistar Rat, DACO: 4.5.9
2249346	2008, Absorption, Distribution, Metabolism and Excretion of OIT in Bile-cannulated Wistar Rat, DACO: 4.5.9
2249348	2006, Development and Validation of an Analytical Method for the Analysis of OIT in Altromin Pellet Rat and Dog Diet, DACO: 4.8

Additional Information Considered
Published Information

PMRA Document Number	Reference
2249337	Reregistration Eligibility Decision for 2-Octyl-3 (2H)-isothiazolone (OIT). United States Environmental Protection Agency, EPA 739-R-07-008, September 2007.
2401009	Evaluation of Toxicology Database for the Reregistration Eligibility Decision Document Disciplinary Chapter, United States Environmental Protection Agency, October 31, 2007.
2036390	Proposed Registration Decision: 2-Methyl-4-isothiazolin-3-one, PRD2011-02. Pest Management Regulatory Agency, Health Canada, March 25, 2011.

C. Studies Considered in the Environmental Risk Assessment

List of Studies/Information Submitted by Applicant/Registrant (Unpublished)

PMRA Document Number	Reference
1018234	1998, Acticide OIT 100% Fish (Rainbow Trout), Acute Toxicity Test, 96 h, Semi-Static, DACO: 9.5.2.1
1142169	1990, Octhilinone: 8-Day Acute Dietary LC50 Study in Bobwhite Quail, DACO: 9.6.2.1
1142170	1990, 8-Day Acute Dietary LC50 Study in Mallard Ducklings, DACO: 9.6.2.1
1142175	1990, Acute Toxicity to Sheepshead Minnow under Flow Through Conditions, DACO: 9.5.2.1
1142177	1990, Acute Toxicity to Mysid Shrimp under Flow Through Conditions , DACO; 9.4.1
1232126	1979, Acute Oral LD50 - Bobwhite Quail, DACO;9.6.2.1
1232129	1979, Acute Toxicity of RH-893 Tech to Daphnia Magna, DACO: 9.5.2.1
1401581	2007, 2-(N-Octyl)-4-[4,5-14C]Isothiazolin-3-One (14C-OIT): Photolysis on Soil Surface Under Laboratory Conditions, DACO: 8.2.2.1, 8.2.2.2, 8.2.2.3, 8.2.2.4, 8.2.3.3.1
1401583	2007, Phototransformation of 2-(N-Octyl)-[4,5-14C]Isothiazolin-3-One (14C-OIT) in Water - Direct Photolysis, DACO: 8.2.2.3, 8.2.3.3.2
1401584	2007, 2-(N-Octyl)-4-Isothiazolin-3-One: Estimation of Degradation by Photo-Oxidation in Air, DACO: 8.2.3.3.3
1401585	2007, 2-(N-Octyl)-4-[4,5-14C]Isothiazolin-3-One (14C-OIT): Degradation and Metabolism in Three Soils Incubated under Aerobic Conditions, DACO: 8.2.3.4.2
1401586	2007, 2-(N-Octyl)-4-[4,5-14C]Isothiazolin-3-One (14C-OIT): Aerobic Mineralisation in Surface Water - Simulation Biodegradation Test, DACO: 8.2.3.5.2
1401587	2007, 2-(N-Octyl)-4-[4,5-14C]Isothiazolin-3-One (14C-OIT): Aerobic Mineralisation in Sea Water Simulation Biodegradation Test, DACO: 8.2.3.5.2
1401589	2007, 2-(N-Octyl)-4-[4,5-14C]Isothiazolin-3-One (14C-OIT)2-(N-Octyl)-4-[4,5-14C]Isothiazolin-3-One (14C-OIT): Volatilisation from a Soil Surface, DACO: 8.2.4.5
1401591	2007, 2-(N-Octyl)-4-[4,5-14C]Isothiazolin-3-One (14C-OIT): Volatilisation from Water, DACO: 8.2.4.5

1401594	2007, Bioconcentration: Flow-Through Fish Test with 2-(N-Octyl)-4- [4,5-14c]Isothiazolin-3-One (14C-OIT) in Rainbow Trout (Oncorhynchus Mykiss), DACO: 9.5.6
1401596	2007, Toxicity to Skeletonema Costatum (Marine Algae) in a 96-Hour Algal Growth Inhibition Test, DACO: 9.8.3
1401597	2007, 2-N-Octyl-4-Isothiazolin-3-One (OIT): Toxicity to the Aquatic Higher Plant Lemna Gibba in a 7-Day Static Growth Inhibition Test, DACO: 9.8.5
2177119	1998, C14-Acticide OIT: Hydrolytic Stability, DACO: 8.2.3.2
2177121	Acticide OIT Daphnia magna chronic toxicity test (21 d), DACO: 9.3.3
2177123	1995, Acute Toxicity to Lepomis Macrochirus, DACO: 9.5.2.2
2249350	2007, Adsorption of 2-(N-Octyl)-4-[4,5-14C]Isothiazolin-3-One (14C-OIT) on Activated Sewage Sludge, DACO: 8.2.4.2
2257178	2001, Adsorption and Desorption of RH-893 in Three Soils and One Sediment, DACO: 8.2.4.2

Additional Information Considered
Published Information

PMRA Document Number	Reference
2249337	Reregistration Eligibility Decision for 2-Octyl-3 (2H)-isothiazolone (OIT). United States Environmental Protection Agency, EPA 739-R-07-008, September 2007. Docket ID: EPA-HQ-OPP-2007-0414